

PERFORMANCE REPORT

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INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

2014 Fisheries Management Survey Report

Bachman Reservoir

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SURVEY AND MANAGEMENT SUMMARY

Fish populations in Bachman Reservoir were surveyed in 2014 using electrofishing and trap netting and in 2015 using gill netting. Historical data are presented with the 2014-2015 data for comparison. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

- **Reservoir Description:** Bachman Reservoir, a 132-acre reservoir located on Bachman Branch (a tributary of the Trinity River), was constructed in 1903 by the City of Dallas for water supply. The reservoir is currently used for recreation only and no longer used as a water supply. It is located in Dallas County near the Love Field Airport. Habitat was composed mainly of shoreline emergent vegetation in the form of water willow, *Justicia americana*, and bulkhead in the form of rock gabions. Bachman Reservoir was dredged in 2003 to increase depth and provide better access for boaters.
- **Management History:** Important sport fishes include Largemouth Bass and White Crappie. All fish species have been managed by statewide regulations.
- **Fish Community**
 - **Prey species:** Electrofishing catch rates of Gizzard Shad were above average when compared to previous samples. Threadfin Shad were present but the population was very low in abundance. The total catch rate of Bluegill was above average and much higher than 2010. Longear Sunfish were also present in moderate abundance. Other sunfishes including Green Sunfish and Warmouth were present in low numbers.
 - **Catfishes:** Channel Catfish were present in the reservoir although the total catch rate was lower than 2010. Blue Catfish were stocked in 2003 and only one was captured in 2015 by gill netting. This was the only Blue Catfish caught during sampling since the initial stocking in 2003.
 - **White Bass:** No White Bass have been captured during the last three gill netting surveys.
 - **Largemouth Bass:** The Largemouth Bass total catch rate in 2014 continues to be well above average when compared to previous sample years. Population structure and body condition of the population remain good.
 - **White Crappie:** Trap netting total catch rate in 2014 was much higher than previous sample years. However, the size distribution is skewed toward smaller fish.
- **Management Strategies:** This reservoir will be monitored with electrofishing and trap netting in 2018 and gill netting in 2019. Partner with bank angling groups to assist in building artificial habitat structures. Continue to promote the utilization of the reservoir by news releases and media. Stock Florida Largemouth Bass to increase genetic potential and conduct a category 2 survey to determine on average how long it takes to attain 14-inches. Continue to maintain public awareness of aquatic invasive species.

INTRODUCTION

This document is a summary of fisheries data collected from Bachman Reservoir in 2014-2015. The purpose of the document is to provide fisheries information and make management recommendations to protect and improve the sport fishery. While information on other species of fishes was collected, this report deals primarily with major sport fishes and important prey species. Historical data are presented with the 2014-2015 data for comparison.

Reservoir Description

Bachman Reservoir is a 132-acre reservoir located on Bachman Branch (a tributary of the Trinity River). The reservoir was constructed in 1903 by the City of Dallas for water supply. The reservoir is no longer used as a water supply but is used for recreation. It is located in Dallas County near the Love Field Airport. The watershed is primarily industrial with a major airport, Love Field, residing next to the reservoir. A park surrounds the reservoir and provides recreational opportunities for the citizens of Dallas. The lower half of Bachman Reservoir was dredged in 2003 to increase depth and to provide better access for boaters. The upper half of the Reservoir remains very shallow and virtually inaccessible to boaters. At the time of sampling the fishery habitat was primarily shoreline emergent vegetation in the form of water willow, *Justicia Americana*, and bulkhead in the form of rock gabions. Other descriptive characteristics for Bachman Reservoir are in Table 1. Water level data is not available for the reservoir but little fluctuation of water level occurs; as evident in the recent summers of drought.

Angler Access

Bachman Reservoir has one public boat ramp available for use but parking for boat trailers is limited. There is also a 10.5 horsepower motor restriction for boaters, and electric trolling motors are permitted. Additional boat ramp characteristics are in Table 2. Angler bank access is excellent around the entire reservoir. However, handicapped fishing access is limited.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Brock and Hungerford 2011) included:

1. Bachman Reservoir has a large population of Largemouth Bass and White Crappie. Fishing pressure continues to be low and the resource is underutilized.
Action: Several rod and reel surveys were conducted to determine the best fishing methods to catch Largemouth Bass and White Crappie. Artificial and live bait (minnows) had the most success with both White Crappie and Largemouth Bass. Total fishing time was 8 hours over the span of four days. A total of 18 Largemouth Bass were caught with 7 over the 14 -inch minimum length limit. A total of 20 White Crappie were caught and 1 Channel Catfish was caught over the 12-inch minimum length limit (Appendix D).
2. Invasive species like zebra mussels (*Dreissena polymorpha*) and Giant Salvinia (*Salvinia molesta*) continue to be a threat to aquatic habitats and organisms in Texas. Adversely, this can also affect the state ecologically, environmentally, and economically.
Action: Educated the public about invasive species through the use of media, the Internet and talking points.

Harvest regulation history: Sport fish populations in Bachman Reservoir have been managed with statewide regulations throughout the history of the Reservoir. Current regulations are found in Table 3.

Stocking history: Bachman Reservoir has been stocked consistently since 2004 with Channel Catfish. Blue Catfish were stocked in 2003. The complete stocking history is in Table 4.

Water transfer: Bachman Reservoir is no longer used as a drinking water supply for the City of Dallas. No water is transferred into or out of the reservoir.

METHODS

Fishes were collected by electrofishing (0.5 hours at 6, 5-min stations), gill netting (5 net nights at 5 stations), and trap netting (3 net nights at 3 stations). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing and, for gill and trap nets, as the number of fish per net night (fish/nn). All survey sites were randomly selected and all surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2014). Effort of gill netting increased from 3 net nights to 5 net nights based on the annual stocking of adult Channel Catfish.

Sampling statistics (CPUE for various length categories), structural indices [Proportional Size Distributions (PSD) as defined by Guy et al. (2007)], and condition indices [relative weight (W_r)] were calculated for target fishes according to Anderson and Neumann (1996). Index of vulnerability (IOV) was calculated for Gizzard Shad (DiCenzo et al. 1996). Relative standard error ($RSE = 100 \times SE$ of the estimate/estimate) was calculated for all CPUE statistics and SE was calculated for structural indices and IOV. No age and growth information was collected.

Genetic analysis of Largemouth Bass was conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2014). Micro-satellite DNA analysis was used to determine genetic composition of individual fish from 2005 through 2012 and by electrophoresis for previous years.

RESULTS AND DISCUSSION

Habitat: Bachman Reservoir habitat has remained consistent with the dominant habitat consisting of shoreline emergent vegetation in the form of water willow and bulkhead in the form of rock gabions (Brock and Hungerford 2010). Water level is stable. A habitat survey of Bachman Reservoir was last conducted in 2010 (Brock and Hungerford 2011).

Prey species: Threadfin Shad were collected in 2014 using electrofishing with a catch rate of 82.0/h. See Appendix C. The electrofishing catch rate of Gizzard Shad was 758.0/hr and was higher than previous sampling years. Index of vulnerability (IOV) for Gizzard Shad continues to be high, indicating that 96% of Gizzard Shad were available as prey items in the reservoir (Figure 1). Total CPUE of Bluegill was 468.0/h which was much higher than the previous sample (Figure 2). The Bluegill population has a considerable number of quality sized fish (>6 inches) however, the PSD value of 12 continues to be low. Longear Sunfish catch rate was 76.0/h in 2014 which was much lower than average.

Catfishes: One Blue Catfish was captured during the 2015 gill netting survey. No Blue Catfish have been collected since the stocking in 2003. It has taken Blue Catfish populations several years to become established in other district reservoirs, but it is unclear why this doesn't happen at Bachman. In 2015 the Channel Catfish gill netting catch rate was 1.6/nn which was significantly lower than 2011 (Figure 3). Size distribution of the Channel Catfish is 12-inches to 22-inches.

Largemouth Bass: The total electrofishing catch rate of Largemouth Bass was 294.0/h which is high compared to previous years (Figure 4). Since sampling began in 2002, catch rates of Largemouth Bass in the reservoir have been historically high. Size distribution of the population continues to be very good as reflected in PSD and PSD-P values of 49 and 26, respectively. The catch rate of Largemouth Bass \geq 14 inches in length increased from 38.0/h in 2010 to 46.0/h in 2014. Body conditions were good for nearly all size classes.

White Crappie: The total trap netting catch rate of White Crappie was 163.3/nn in 2014 which was an increase from the trap netting catch rate of 124.0/nn in 2010 (Figure 6). The size structure changed from 2010 as indicated by PSD and PSD-P values of 68 and 19, respectively. Body conditions were above 90 for most size classes (Figure 6).

Fisheries management plan for Bachman Reservoir, Texas

Prepared – July 2015.

ISSUE 1: Bachman Reservoir has a large population of Largemouth Bass but the genetic potential of the population is limited.

MANAGEMENT STRATEGIES

1. A category 2 age and growth survey will be conducted in Fall 2018 to determine on average how long it takes Largemouth Bass to attain 14-inches.
2. Stock Florida Largemouth Bass to increase trophy genetic potential of the population. Florida Largemouth Bass will be stocked in 2016 and 2017 at 5 fish/acre.

ISSUE 2: Many invasive species threaten aquatic habitats and organisms in Texas and can adversely affect the state ecologically, environmentally, and economically. For example, zebra mussels (*Dreissena polymorpha*) can multiply rapidly and attach themselves to any available hard structure, restricting water flow in pipes, fouling swimming beaches and plugging engine cooling systems. Giant Salvinia (*Salvinia molesta*) and other invasive vegetation species can form dense mats, interfering with recreational activities like fishing, boating, skiing and swimming. The financial costs of controlling and/or eradicating these types of invasive species are significant. Additionally, the potential for invasive species to spread to other river drainages and reservoirs via watercraft and other means is a serious threat to all public waters of the state.

MANAGEMENT STRATEGIES

1. Cooperate with the City of Dallas to post appropriate signage at access points around the reservoir.
2. Educate the public about invasive species through the use of media and the internet.
3. Make a speaking point about invasive species when presenting to constituent and user groups.

ISSUE 3: Bachman Reservoir lacks habitat for fishes.

MANAGEMENT STRATEGIES

1. Partner with bank angling groups to help build artificial habitat structures to increase fish catchability..
2. Monitor the success of the artificial habitat structures by surveying anglers and sampling the structures after a period of time.

SAMPLING SCHEDULE JUSTIFICATION

General monitoring of sport fish species with electrofishing, trap netting, and gill netting will be conducted every 4 years. Conduct an additional tandem hoop netting survey to look at Blue and Channel Catfish catch rates. Proposed sampling is scheduled for 2018-2019. Florida Largemouth Bass will be stocked in 2016 and 2017 to increase the genetic potential of the population. A category 2 survey will be conducted on Largemouth Bass to determine on average how long it takes to attain 14-inches.

LITERATURE CITED

- Anderson, R. O., and R. M. Neumann. 1996. Length, weight, and associated structural indices. Pages 447-482 in B. R. Murphy and D. W. Willis, editors. Fisheries techniques, 2nd edition. American Fisheries Society, Bethesda, Maryland.
- Brock, R. and T. Hungerford. 2011. Statewide freshwater fisheries monitoring and management program survey report for Worth Reservoir, 2006. Texas Parks and Wildlife Department, Federal Aid Report F-30-R31, Austin.
- DiCenzo, V. J., M. J. Maceina, and M. R. Stimpert. 1996. Relations between Reservoir trophic state and Gizzard Shad population characteristics in Alabama reservoirs. North American Journal of Fisheries Management 16: 888-895.
- Guy, C. S., R. M. Neumann, D. W. Willis, and R. O. Anderson. 2007. Proportional Size Distribution (PSD): a further refinement of population size structure index terminology. Fisheries 32(7):348.

Table 1. Characteristics of Bachman Reservoir, Texas.

Characteristic	Description
Year Constructed	1903
Controlling authority	City of Dallas
County	Dallas
Reservoir type	Tributary Trinity River
Conductivity	375 umhos/cm

Table 2. Boat ramp characteristics for Bachman Reservoir, Texas, May, 2015.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
Bachman Lake ramp	32.505865 -96.515695	Y	3	Unknown	Good, no access issues

Table 3. Harvest regulations for Bachman Reservoir, Texas.

Species	Bag Limit	Length Limit
Catfish: Channel and Blue Catfish, their hybrids and subspecies	25 (in any combination)	12-inch minimum
Catfish, Flathead	5	18-inch minimum
Bass: White	25	10-inch minimum
Bass: Largemouth	5	14-inch minimum
Crappie: White and Black Crappie, their hybrids and subspecies	25 (in any combination)	10-inch minimum

Table 4. Stocking history of Bachman Lake, Texas. FGL = fingerling; AFGL = advanced Fingerling; ADL = adults; UNK = unknown.

Species	Year	Number	Life Stage
Blue Catfish	2003	13,313	AFGL
	Total	13,313	
Channel Catfish	1966	6,000	AFGL
	1969	20,000	AFGL
	1976	2,000	AFGL
	1982	180	UNK
	1996	324	AFGL
	1997	400	ADL
	1998	500	ADL
	1999	400	ADL
	2000	400	AFGL
	2002	850	ADL
	2002	50	AFGL
	2004	3,807	AFGL
	2005	662	ADL
	2006	600	ADL
	2007	660	ADL
	2008	660	ADL
	2009	660	ADL
	2010	660	ADL
	2011	695	ADL
	2012	661	ADL
2013	660	ADL	
2014	550	ADL	
Total	41,379		
Florida Largemouth Bass	1976	5,450	FGL
	Total	5,450	
Green Sunfish x Redear Sunfish	1976	6,000	
	Total	6,000	
Largemouth Bass	1967	2,500	UNK
	1976	3,000	UNK
	1982	185	UNK
	Total	5,685	
Redear Sunfish	1976	6,000	
	Total	6,000	

Gizzard Shad

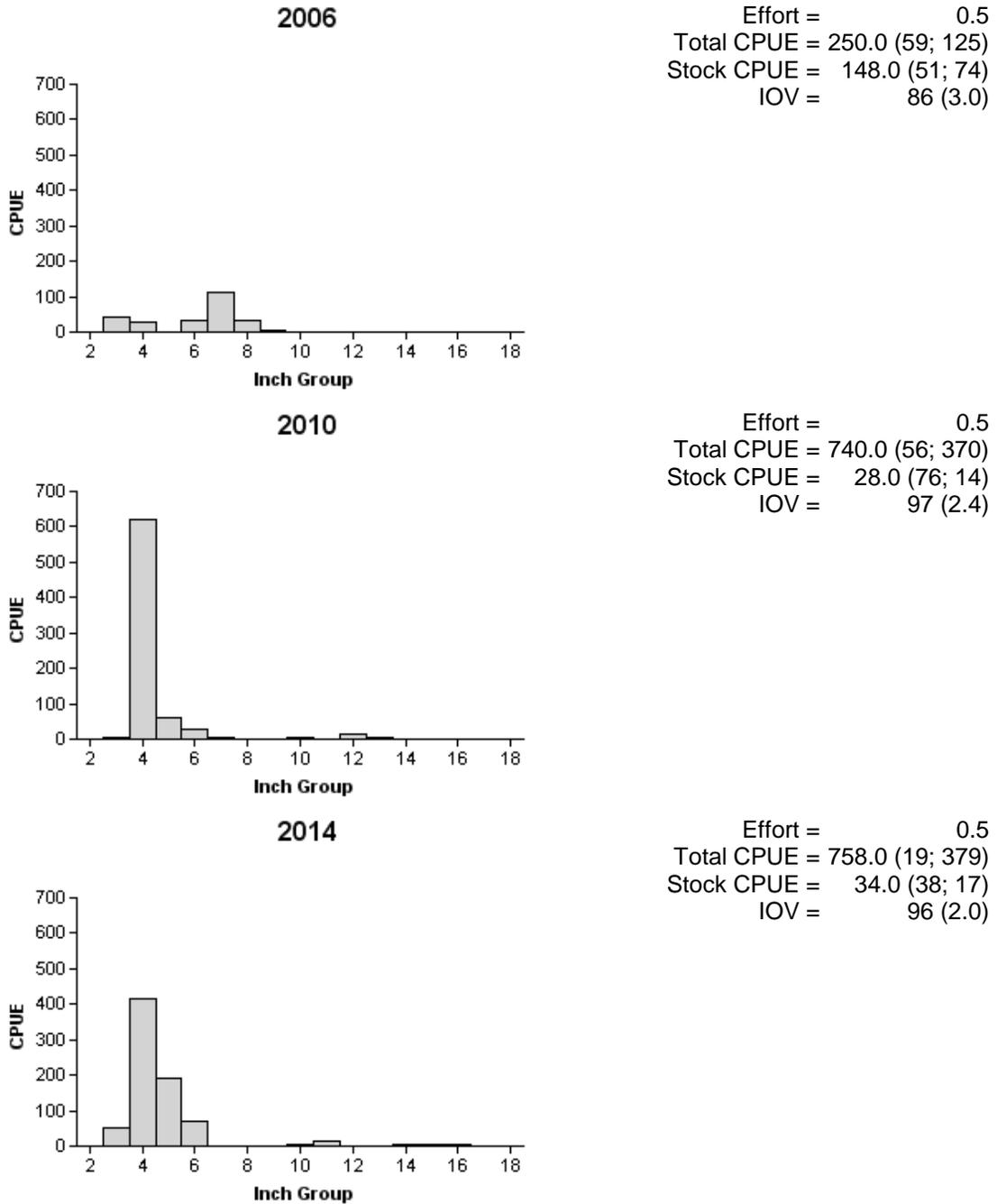


Figure 1. Number of Gizzard Shad caught per hour (CPUE; bars) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Bachman Reservoir, Texas, 2006, 2010, and 2014.

Bluegill

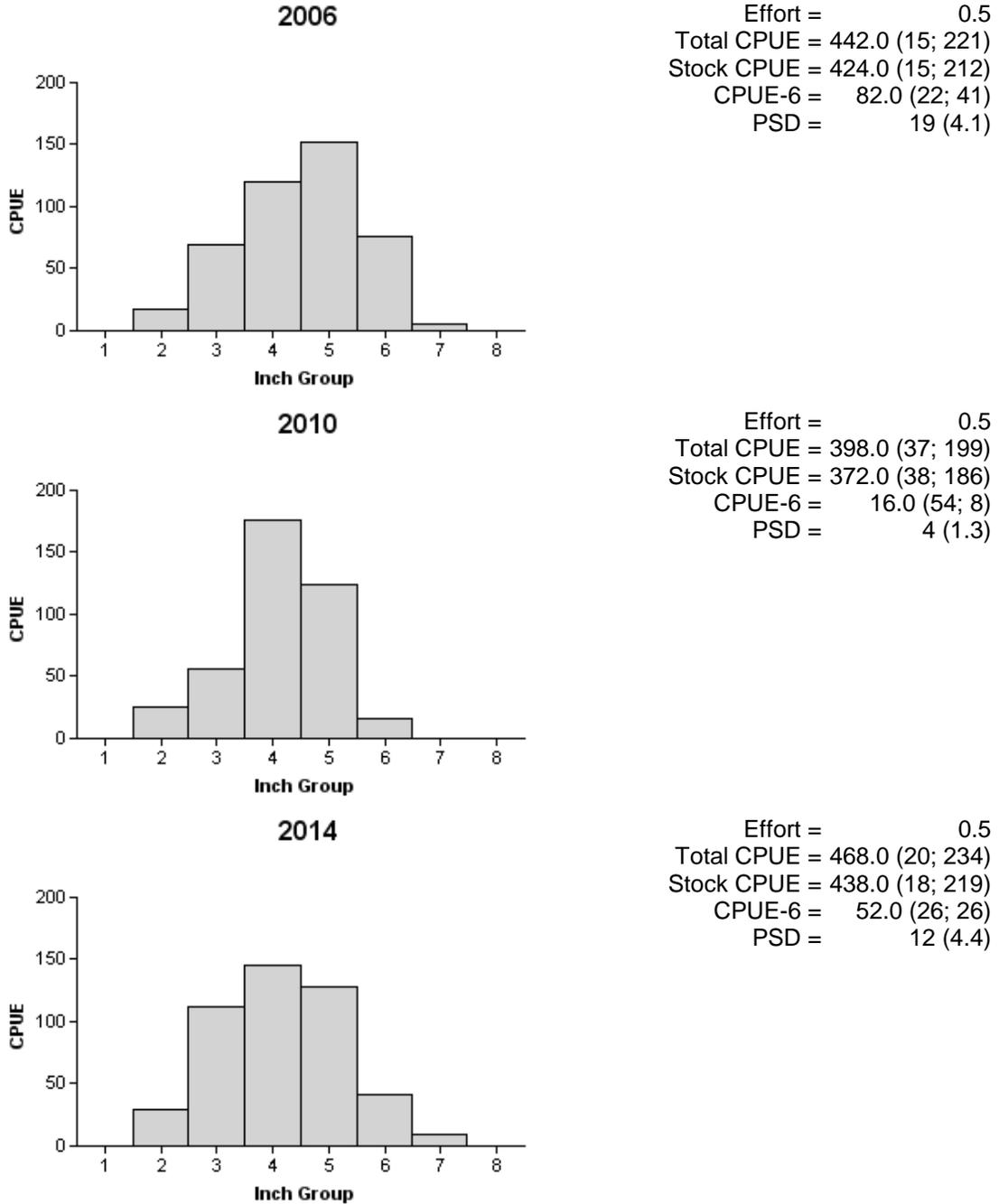


Figure 2. Number of Bluegill caught per hour (CPUE; bars) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Bachman Reservoir, Texas, 2006, 2010, and 2014.

Channel Catfish

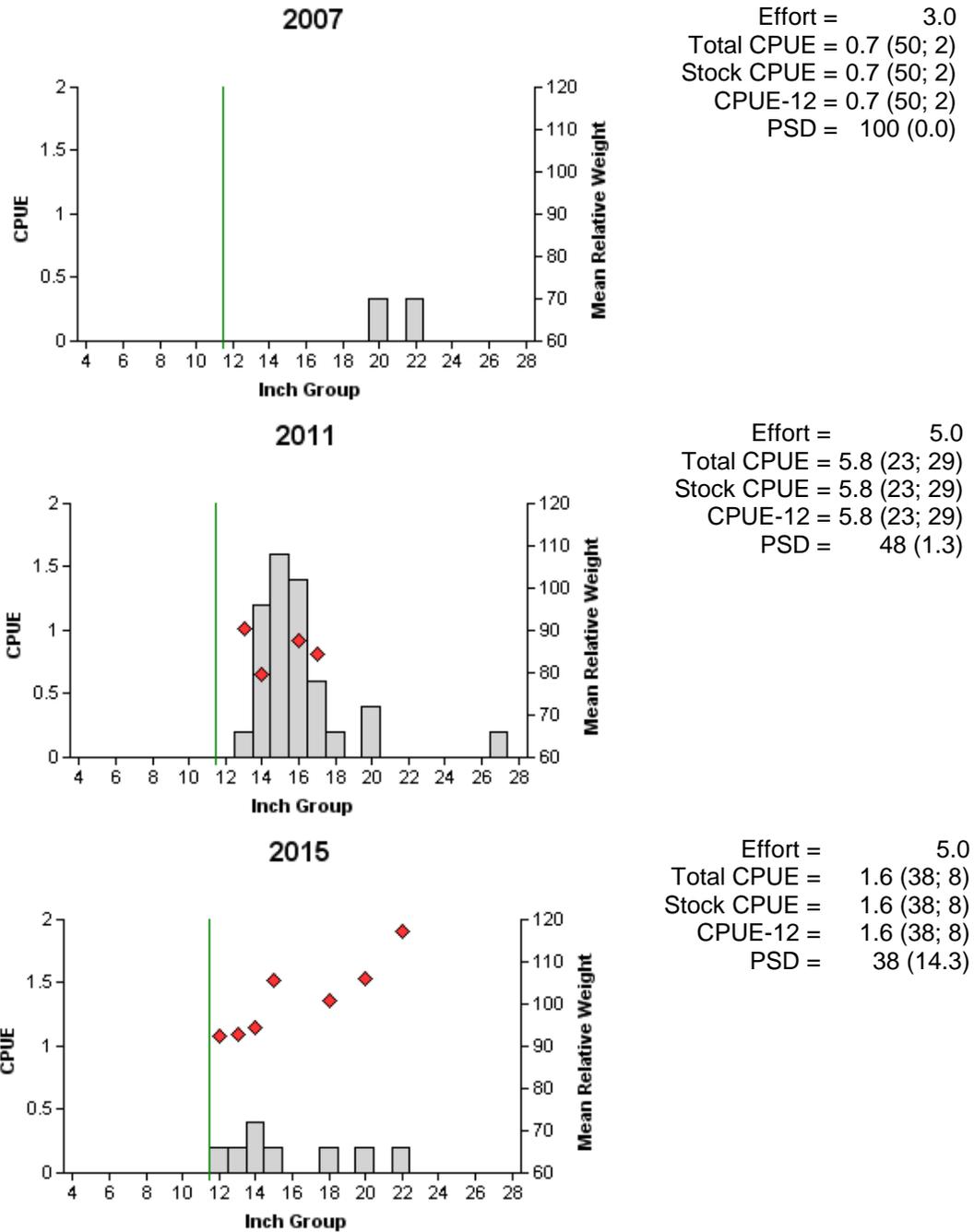
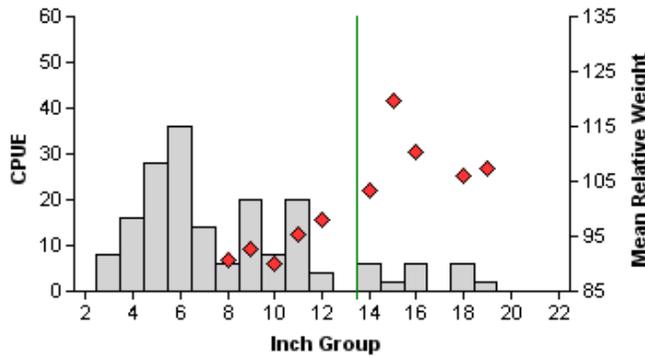


Figure 3. Number of Channel Catfish caught per net night (CPUE; bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for structure are in parentheses) for spring gill net survey Bachman Reservoir, Texas, 2007, 2011, and 2015. Effort was increased to 5.0 in 2010 to closer evaluate Channel Catfish population. Vertical line represents length limit at time of sampling.

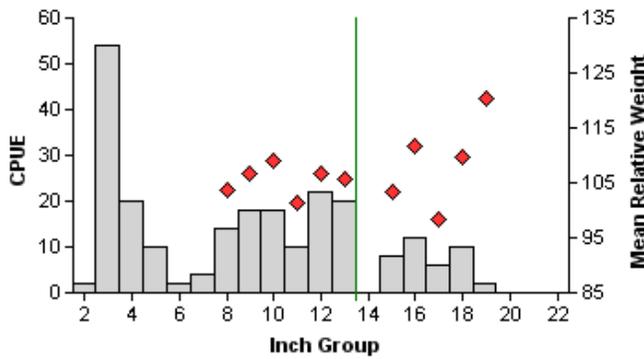
Largemouth Bass

2006



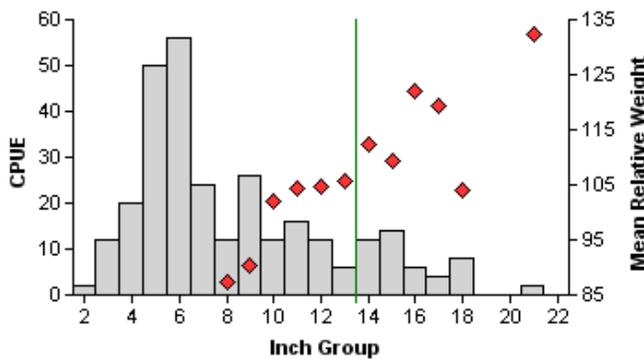
Effort = 0.5
 Total CPUE = 182.0 (15; 91)
 Stock CPUE = 80.0 (16; 40)
 CPUE-14 = 22.0 (33; 11)
 PSD = 32 (9.8)
 PSD-P = 20 (9.5)

2010



Effort = 0.5
 Total CPUE = 232.0 (10; 116)
 Stock CPUE = 140.0 (11; 70)
 CPUE-14 = 38.0 (34; 19)
 PSD = 57 (9)
 PSD-P = 27 (7.8)

2014



Effort = 0.5
 Total CPUE = 294.0 (16; 147)
 Stock CPUE = 130.0 (9; 65)
 CPUE-14 = 46.0 (30; 23)
 PSD = 49 (9.2)
 PSD-P = 26 (9.1)

Figure 4. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Bachman Reservoir, Texas, 2006, 2010, and 2014. Vertical lines represent length limit at time of sampling.

Table 5. Results of genetic analysis of Largemouth Bass collected by fall electrofishing, Bachman Reservoir, Texas, 2002 and 2014. FLMB = Florida Largemouth Bass, NLMB = Northern Largemouth Bass, Intergrade = hybrid between a FLMB and a NLMB. Genetic composition was determined by electrophoresis prior to 2005 and with micro-satellite DNA analysis since 2005.

Year	Sample size	Number of fish			% FLMB alleles	% FLMB
		FLMB	Intergrade	NLMB		
2002	27	0	22	5	33	0
2014	30	0	30	0	48	0

White Crappie

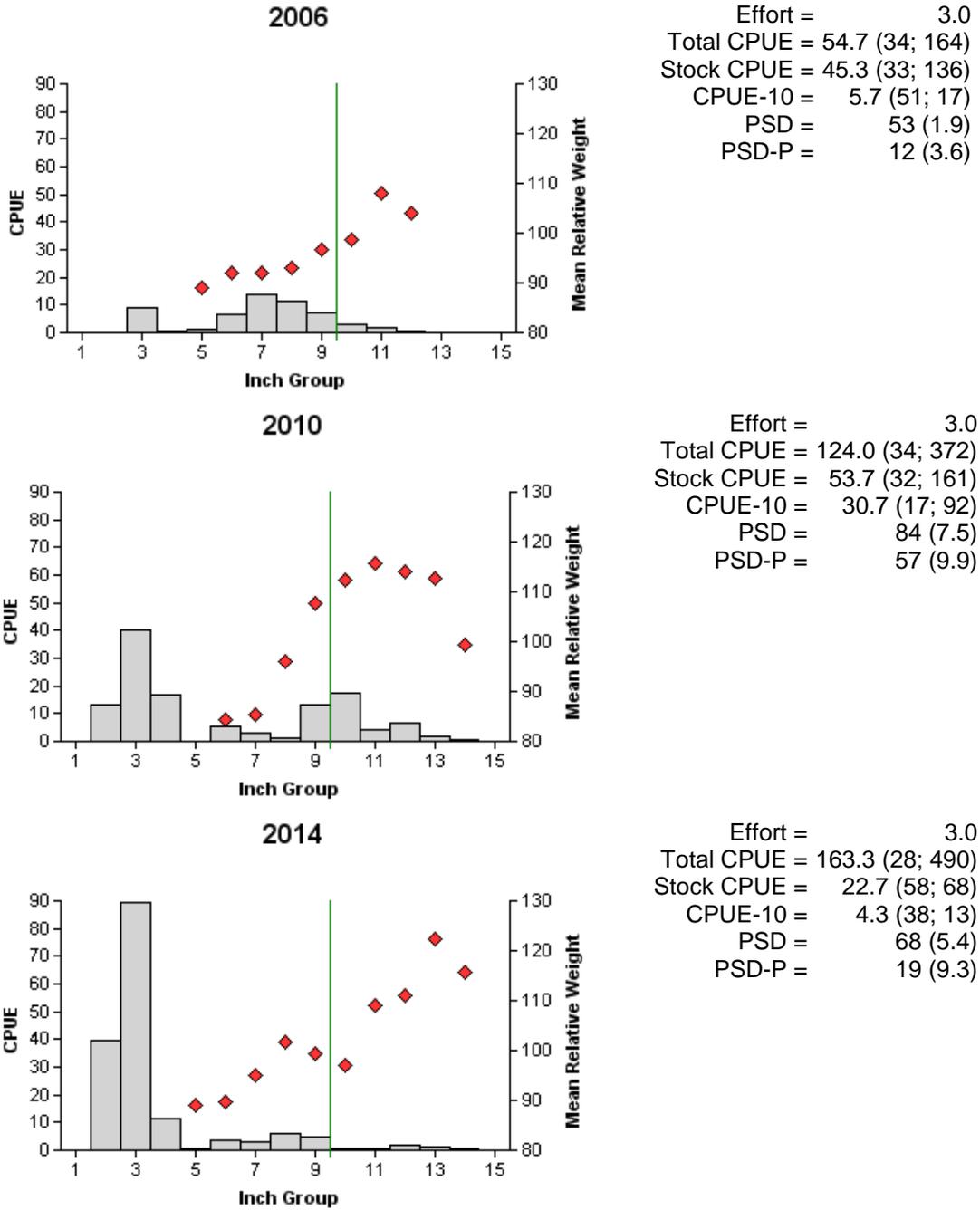


Figure 5. Number of White Crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap net surveys, Bachman Reservoir, Texas, 2006, 2010, and 2014. Vertical line represents length limit at time of sampling.

Table 6. Proposed sampling schedule for Bachman Reservoir, Texas. Survey period is June through May. Gill netting surveys are conducted in the spring, while electrofishing and trap netting surveys are conducted in the fall. Standard surveys are denoted by S and additional surveys denoted by A.

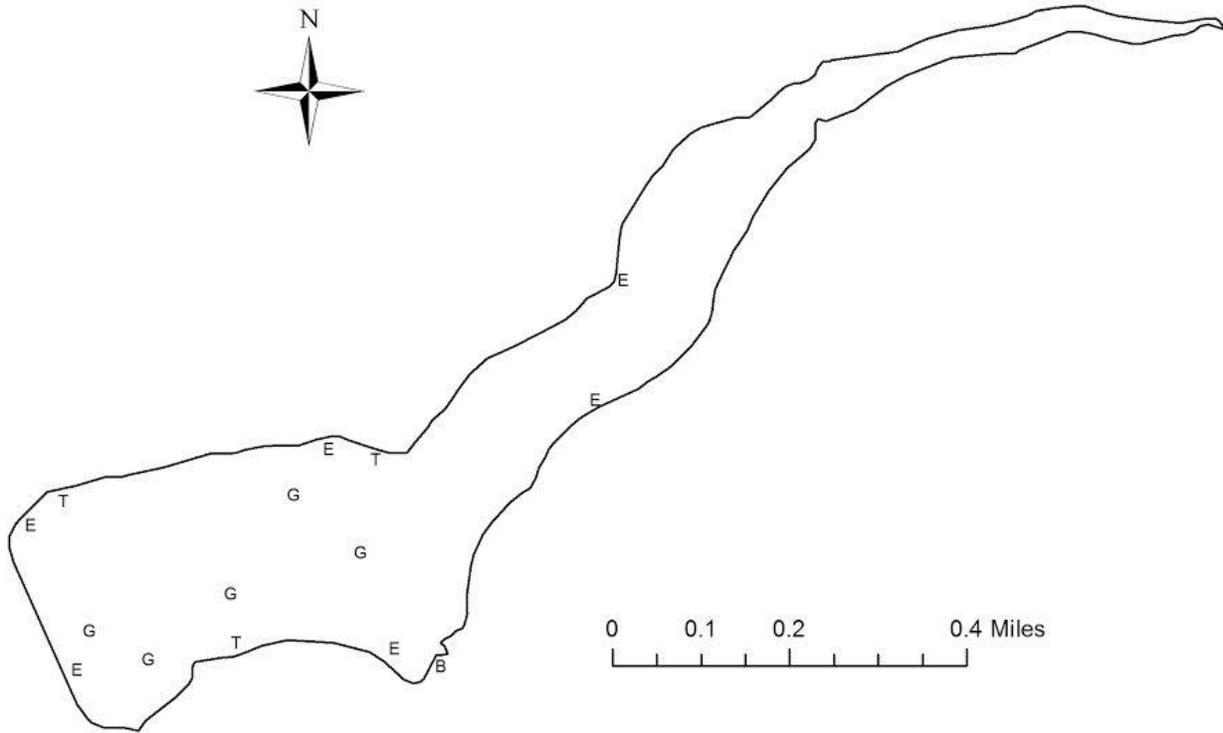
Survey Year	Electrofishing Fall (Spring)	Trap Net	Gill net	Habitat		Access	Creel survey	Report
				Structural	Vegetation			
2015-2016								
2016-2017								
2017-2018								
2018-2019	S	S	S			S		S

APPENDIX A

Number (N) and catch rate (CPUE) of species collected from all gear types from Bachman Reservoir, Texas, 2014-2015. Sampling effort was 5 net nights for gill netting, 3 net nights for trap netting, and 30 minutes for electrofishing.

Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Spotted Gar	6	1.20				
Gizzard Shad	41	8.20			379	758.00
Channel Catfish	8	1.60				
Bluegill					234	468.00
Longear Sunfish					76	38.00
Largemouth Bass					147	294.00
White Crappie			490	163.33		
Blue Catfish	1	.20				
Common Carp	12	2.40				

APPENDIX B



Location of sampling sites, Bachman Reservoir, Texas, 2014-2015. Trap net, gill net, and electrofishing stations are indicated by T, G, and E, respectively. Boat ramp is indicated with a B. Water level was near full pool at time of sampling.

APPENDIX C

Historical catch rates of targeted species by gear type for Bachman Reservoir, Texas.

Gear	Species	Year									
		2002	2003	2004	2005	2006	2007	2010	2011	2014	2015
Gill Netting (fish/net night)	Channel Catfish		0				0.7		5.8		1.6
Electrofishing (fish/hour)	Gizzard Shad	101	364	8	156	250		740		758	
	Threadfin Shad	0	0	0	0	84		0		82	
	Bluegill	9.3	512	82	218	442		398		468	
	Longear Sunfish	5.3	60	24	54	32		202		76	
	Largemouth Bass	192	94	170	368	182		232		294	
Trap Netting (fish/net night)	White Crappie	38.2				54.7		124		163.33	

APPENDIX D

Number (N) and catch rate (CPUE) of species collected from rod and reel sampling at Bachman Reservoir, Texas, 2014-2015. Sampling effort was 18.25 hours.

Date	Time Period	# of Anglers	Hours Fished	Total Hours Fishing	Species (n)		
					Largemouth Bass	White Crappie	Channel Catfish
9/15/2014	11:00-1:30	2	1.5	3	3 (1 over)		
9/23/2014	10:45-1:30	3	1.75	5.25	9 (2 over)	8	
9/30/2014	10:30-1:30	2	3	6	4 (2 over)	12	1 (over)
10/3/2014	11:30-1:30	2	2	4	2 (over)		
CPUE					1.01	1.82	18.25